IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: McConnell, et al.
Serial No.: 09/827,811
Filed: February 28, 2002

Examiner: James A. Kramer
Art Unit: 3627
Confirmation No.: 6863

For: **METHOD AND APPARATUS FOR MONITORING THE EFFECTIVE VELOCITY OF ITEMS THROUGH A STORE OR WAREHOUSE**

Docket No.: S48906 1020.1 (0003.0)
Customer No.: 26158

Mail Stop AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

Sir:

AMENDMENT AND REPLY

Responsive to the Office Action mailed August 1, 2005, Applicants submit herewith an Amendment and Reply.

In addition, please provide a three-month extension of time up to and including February 1, 2006, to answer the Office Action as provided for in 37 CFR 1.136. The Commissioner is hereby authorized to charge the $1020.00 extension of time fee to Deposit Account 09-0528.

If any additional fees for the accompanying response are required, Applicants request that this be considered a Petition therefor. The Commissioner is hereby authorized to charge any additional fees which may be required to Deposit Account 09-0528.

Amendments to the Title begin on page 2 of this paper.

Amendments to the Claims begin on page 3 of this paper.

Remarks/Arguments begin on page 25 of this paper.

Amendments to the Title:

Please amend the Title of Application as follows:

Method and apparatus for monitoring the ~~effective velocity~~ flow of items through a store or warehouse.

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (currently amended) A method of using a computer processor to monitor items being received and disbursed within a predetermined environment, said method comprising:

(a) providing a computer monitoring system having a memory circuit for storage of data, a communications port, and a processing circuit;

(b) providing a plurality of sensing circuits that detect at least one item as it is moved to predetermined locations within said predetermined environment;

(c) receiving, by way of said communications port, identification characteristic information pertaining to said at least one item as it passes one of said plurality of sensing circuits, and receiving ~~time-related information corresponding to~~ an arrival time, wherein said arrival time is a time when said at least one item was detected by the one of said plurality of sensing circuits;

(d) determining, by way of said processing circuit, a waiting time for said at least one item, wherein said waiting time is an amount of time between said arrival time and a later time, wherein said later time is prior to a next time said at least one item is again detected by one of said plurality of sensing circuits;

(~~d~~e) retrieving, from said memory circuit, a probability ~~pattern of a velocity of~~ distribution over inter-arrival times for said at least one item, wherein an inter-arrival time is an amount of time between an arrival of said at least one item and a next arrival of said at least one item, and wherein said probability ~~pattern~~ distribution is retrieved, by way of said processing

circuit, based on said identification characteristic information ~~and said time-related information~~; and

~~(e) comparing an observed velocity of said at least one item passing one of said plurality of sensing circuits to said probability pattern, wherein the observed velocity is an inter-arrival time for said at least one item, and~~

(f) determining, by way of said processing circuit, based on said retrieved probability distribution, ~~whether or not said observed velocity~~ that said waiting time is anomalous if a cumulative probability of all inter-arrival times that are greater than said waiting time is less than a predetermined threshold; and

(g) ~~if so~~ generating, by way of said processing circuit, ~~a velocity~~ an inter-arrival time event announcement ~~that said observed velocity is one of: (i) occurring too slowly, or (ii) occurring too quickly~~ for said at least one item whenever said waiting time is anomalous.

2. (currently amended) The method as recited in claim 1, further comprising updating said probability ~~pattern of a velocity of~~ distribution over inter-arrival times for said at least one item after it passes one of said plurality of sensing circuits, and storing said updated probability ~~pattern~~ distribution in said memory circuit, wherein the step of updating said probability ~~pattern of a velocity of~~ distribution over inter-arrival times for said at least one item occurs during a Learning Mode of operation of said computer monitoring system.

3. (currently amended) The method as recited in claim 1, further comprising storing said probability distribution in said memory circuit, wherein the step of storing said probability ~~pattern~~ distribution in said memory circuit comprises: creating or modifying an entry in a database that is stored in said memory circuit such that said entry can later be accessed in substantially real time upon the occurrence of the step of ~~comparing an observed velocity to said~~

~~probability pattern~~ determining, by way of said processing circuit, whether said waiting time is anomalous.

4. (original) The method as recited in claim 1, wherein said identification characteristic information comprises: an SKU identifier of said at least one item, or a bar code from a label affixed to said at least one item.

5. (currently amended) The method as recited in claim 1, wherein the step of ~~comparing an observed velocity to said probability pattern~~ determining, by way of said processing circuit, whether said waiting time is anomalous occurs substantially in real time with respect to the occurrence of said step of receiving identification characteristic information pertaining to said at least one item as it passes one of said plurality of sensing circuits, during a Detection Mode of operation of said computer monitoring system.

6. (original) The method as recited in claim 1, wherein the step of receiving identification characteristic information pertaining to said at least one item as it passes one of said plurality of sensing circuits occurs when said at least one item is being sold at a point-of-sale register within said predetermined environment, during a Detection Mode of operation of said computer monitoring system.

7. (currently amended) The method as recited in claim 6, wherein the step of generating ~~a velocity~~ an inter-arrival time event announcement when said ~~observed velocity~~ waiting time is ~~occurring too slowly~~ anomalous is indicative of one of the following conditions: (i) said at least one item is substantially hidden while residing in its correct location on a display shelf; (ii) said at least one item is completely out-of-stock on said display shelf; (iii) said at least one item has been placed at an incorrect location within said predetermined environment, or (iv) access to said at least one item has been substantially prevented by an obstruction.

8. (cancelled)

9. (currently amended) The method as recited in claim 6, wherein said step of determining, by way of said processing circuit, whether ~~or not~~ said ~~observed velocity~~ waiting time is anomalous comprises: comparing the ~~observed velocity~~ inter-arrival time of said at least one item to ~~a probability velocity model~~ said probability distribution over inter-arrival times for said at least one item, while taking into consideration at least one of the following factors: varying price conditions, time of day, day of week, week of year, holidays, promotion activities, or competitive activities.

10. (currently amended) The method as recited in claim 6, wherein said step of determining whether or not said ~~observed velocity~~ waiting time is anomalous comprises: comparing the ~~observed velocity~~ waiting time of said at least one item to ~~a probability velocity model~~ said probability distribution over inter-arrival times for said at least one item, while taking into consideration a usage history of items being disbursed and received.

11. (currently amended) The method as recited in claim 9, wherein said Detection Mode of operation and said Learning Mode of operation occur simultaneously to refine said probability ~~velocity model~~ distribution over inter-arrival times for said at least one item, and further to detect a new item event and to begin creating a probability ~~velocity model~~ distribution over inter-arrival times for any such new item.

12. (currently amended) An item ~~velocity~~ monitoring system, comprising:

(a) a plurality of sensing circuits that detect at least one item as it is moved to predetermined locations within a predetermined environment;

(b) a computer monitoring system, comprising:

(i) a memory circuit for storage of data, said memory circuit containing a quantity

of random access memory (RAM) and a bulk memory storage device;

(ii) a communications port that is ~~effectively~~ connected to at least one of said sensing circuits and to said memory circuit; and

(iii) a processing circuit that is configured to control the flow of data between said memory circuit and said communications port;

(c) said processing circuit also being configured to:

(i) receive, by way of said communications port, identification characteristic information pertaining to said at least one item as it passes one of said plurality of sensing circuits, and to receive ~~time-related information corresponding to~~ an arrival time, wherein said arrival time is a time when said at least one item was detected by the one of said plurality of sensing circuits;

(ii) determine, by way of said processing circuit, a waiting time for said at least one item, wherein said waiting time is an amount of time between said arrival time and a later time, wherein said later time is prior to a next time said at least one item is again detected by one of said plurality of sensing circuits;

(iii) retrieve, from said memory circuit, a probability ~~pattern of a velocity of~~ distribution over inter-arrival times for said at least one item, wherein an inter-arrival time is an amount of time between an arrival of said at least one item and a next arrival of said at least one item, and wherein said probability ~~pattern~~ distribution is retrieved, by way of said processing circuit, based on said identification characteristic information ~~and said time-related information~~; and

~~(iii) compare an observed velocity of said at least one item passing one of said plurality of sensing circuits to said probability pattern, wherein the observed velocity is~~

~~an inter-arrival time for said at least one item, and to~~

(iv) determine, by way of said processing circuit, based on said retrieved probability distribution, whether ~~or not said observed velocity~~ that said waiting time is anomalous if a cumulative probability of all inter-arrival times that are greater than said waiting time is less than a predetermined threshold; and

(v) ~~if so to~~ generate, by way of said processing circuit, ~~a velocity~~ an inter-arrival time event announcement ~~that said observed velocity is one of: (i) occurring too slowly , or (ii) occurring too quickly~~ for said at least one item whenever said waiting time is anomalous.

13. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 12, further comprising: a point-of-sale controller that is in communication with said plurality of sensing circuits and with said communications port.

14. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 12, wherein said predetermined environment comprises a retail store.

15. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 12, wherein said predetermined environment comprises a warehouse.

16. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 12, wherein said predetermined environment comprises a manufacture's distribution center.

17. (currently amended) A method of using a computer processor to analyze ~~velocity patterns of movement~~ inter-arrival times of items being received and disbursed within a predetermined environment, said method comprising: (a) providing a computer monitoring system having a memory circuit for storage of data, and a processing circuit; (b) receiving identification data and time data pertaining to at least one transaction involving at least one item

of inventory in said predetermined environment; and (c) retrieving a probability ~~pattern of a velocity of~~ distribution over inter-arrival times for said at least one item based on said identification data and time data, after said at least one transaction, to determine whether an observed ~~velocity~~ inter-arrival time for said at least one item is anomalous ~~one of: (i) occurring too slowly or (ii) occurring too quickly~~.

18. (currently amended) The method as recited in claim 17, further comprising updating said probability ~~pattern of a velocity of~~ distribution over inter-arrival times for said at least one item after said at least one transaction, wherein said updated probability ~~pattern~~ distribution is stored in said memory circuit and uses a statistical model to predict a probability of inter-arrival times of said at least one item.

19. (original) The method as recited in claim 18, wherein said statistical model comprises a modified Poisson distribution.

20. (original) The method as recited in claim 18, further comprising: detecting an Out-of-Stock Event using a probability of observing zero sales of said at least one item since a last observed sale of that item.

21. (original) The method as recited in claim 20, wherein said Out-of-Stock Event comprises a time interval during which said at least one item appears to be physically out-of-stock, and upon the occurrence of said Out-of-Stock Event the computer monitoring system summarizes events, including fast events and slow events, determines their causes, and measures their impacts.

22. (currently amended) The method as recited in claim 20, wherein said computer monitoring system provides forecasting of inventory or replenishment levels that removes effects of ~~stock-outs~~ out of stock events before generating forecasting reports.

23. (currently amended) The method as recited in claim 17, wherein said probability ~~pattern~~ distribution is determined by training said computer monitoring system by use of one of: (i) historical transaction data, or (ii) transaction data that is gathered in substantially real time.

24. (original) The method as recited in claim 23, wherein said training of the computer monitoring system occurs in a plurality of iterative passes to create: a Final Base Lambda Table, a Final Adjustment Alpha Table, a Store Table, and a UPC Table or Item Table.

25. (currently amended) The method as recited in claim 24, wherein said Final Base Lambda Table, Final Adjustment Alpha Table, Store Table, and UPC Table or Item Table are used to calculate a probability distribution ~~for an~~ of inter-arrival ~~interval between sales of~~ times for said at least one item, and wherein said inter-arrival ~~interval~~ time is stated either in units of quantity or sales in monetary units.

26. (original) The method as recited in claim 19, wherein store sales or category sales are used to measure time in said modified Poisson distribution for inter-arrival times.

27. (original) The method as recited in claim 26, wherein a choice is made whether to use store or category sales for time via standard deviations and standard errors for variables Lambda_1 and Lambda_2 of said modified Poisson distribution.

28. (original) The method as recited in claim 26, wherein a Poisson parameter lambda is a function of Base Lambda and Adjustment Alpha, which include information as saved data and lookup tables on: SKU, store, and various effects, including price point, promotion, season, holiday, time-of-day, day-of-week, and market conditions.

29. (original) The method as recited in claim 28, wherein a median is used to estimate said Lambda model parameter, thereby reducing bias in an estimate of a true Lambda parameter arising from a contaminating effect of historical out-of-stock events.

30. (currently amended) The method as recited in claim 17, wherein ~~the velocity of said at least one item comprises two random variables,~~ an inter-arrival time and a quantity of an item ~~,~~ ~~which~~ are linked together as a renewal-reward process, in which the quantity of ~~an~~ the item is a separate random log-normal variable with a mean beta and a beta variance, and wherein said inter-arrival time comprises a modified Poisson distribution.

31. (original) The method as recited in claim 30, wherein said mean and variance parameters to the renewal-reward process are not constants, but vary during the inter-arrival time as ~~effects~~ conditions at said predetermined environment change.

32. (original) The method as recited in claim 18, further comprising: detecting a slow event using a probability of observing more than K sales of said at least one item in the time actually observed for K arrivals of that item.

33. (original) The method as recited in claim 18, further comprising: detecting a fast event using a probability of observing less than J sales of said at least one item in the time actually observed for J arrivals of that item.

34. (currently amended) A method of using a computer processor to analyze ~~velocity~~ patterns of ~~movement~~ inter-arrival times of items being received and disbursed within a predetermined environment, said method comprising: (a) providing a computer monitoring system having a memory circuit for storage of data, and a processing circuit; and (b) automatically training said computer monitoring system using either historical data or data gathered in substantially real time, thereby learning ~~item velocities~~ patterns of inter-arrival times for a plurality of items.

35. (currently amended) The method as recited in claim 34, wherein said ~~item velocities~~ inter-arrival times vary as a function of: total predetermined environment ~~velocity~~ traffic, item

category traffic, time of day, day of week, season, holidays, and market conditions of said predetermined environment.

36. (original) The method as recited in claim 34, wherein said predetermined environment comprises one of: a retail store, a chain of retails stores, a warehouse, a chain of warehouses, a distribution point, or a chain of distribution points.

37. (original) The method as recited in claim 34, further comprising: automatically re-training said computer monitoring system on a periodic basis using substantially real time data throughout a periodic interval.

38. (original) The method as recited in claim 34, wherein said training of the computer monitoring system occurs in a plurality of iterative passes to create: a Final Base Lambda Table, a Final Adjustment Alpha Table, a Store Table, and a UPC Table.

39. (original) The method as recited in claim 38, wherein said iterative passes comprise: (i) computing Initial Base Lambdas using total store sales and total category sales; (ii) computing Intermediate Base Lambdas using item transaction data and said item's inter-arrival time using said Initial Base Lambdas; (iii) computing Initial Adjustment Alphas using an adjusted item inter-arrival time and a plurality of current effects; (iv) computing Final Base Lambdas using said Initial Adjustment Alphas and using said item transaction data and said item's inter-arrival time; and (v) computing Final Adjustment Alphas using said Final Base Lambdas and a plurality of current effects, and computing a Beta Table.

40. (currently amended) The method as recited in claim 39, wherein said Final Base Lambda Table, Final Adjustment Alpha Table, Store Table, and UPC Table are used to calculate a probability distribution ~~for an~~ of inter-arrival ~~interval between sales of~~ times for said at least one item, and wherein said inter-arrival ~~interval~~ time is stated either in units of: (i) time, or (ii)

quantity of sales in monetary units.

41 – 82. (cancelled)

83. (currently amended) An item ~~velocity~~ monitoring system, comprising:

(a) a plurality of sensing circuits that detect at least one item as it is moved to predetermined locations within a predetermined environment;

(b) a computer monitoring system, comprising:

(i) a memory circuit for storage of data, said memory circuit containing a quantity of random access memory (RAM) and a bulk memory storage device;

(ii) a communications port that is ~~effectively~~ connected to at least one of said sensing circuits and to said memory circuit; and

(iii) a processing circuit that is configured to control the flow of data between said memory circuit and said communications port;

(c) said processing circuit also being configured to:

(i) receive, by way of said communications port, identification data and time data pertaining to at least one transaction involving at least one item of inventory in said predetermined environment; and

(ii) retrieve a probability ~~pattern of a velocity of~~ distribution over inter-arrival times for said at least one item based on said identification data and time data, after said at least one transaction, to determine whether an ~~observed velocity~~ inter-arrival time is anomalous ~~one of: (i) occurring too slowly, or (ii) occurring too quickly~~.

84. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 83, said processing circuit also being configured to: (iii) update said probability ~~pattern of a velocity of~~

distribution over inter-arrival times for said at least one item after said at least one transaction, wherein said updated probability ~~pattern~~ distribution is stored in said memory circuit and uses a statistical model to predict a probability of inter-arrival times of said at least one item.

85. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 84, wherein said processing circuit is further configured to detect an Out-of-Stock Event using a probability of observing zero sales of said at least one item since a last observed sale of that item.

86. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 85, wherein said Out-of-Stock Event comprises a waiting time ~~interval~~ during which said at least one item appears to be physically out-of-stock, and upon the occurrence of said Out-of-Stock Event the computer monitoring system summarizes events, determines their causes, and measures their impacts.

87. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 84, wherein said probability ~~pattern~~ distribution is determined by training said computer monitoring system by use of one of: (i) historical transaction data, or (ii) transaction data that is gathered in substantially real time.

88. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 87, wherein said training of the computer monitoring system occurs in a plurality of iterative passes to create: a Final Base Lambda Table, a Final Adjustment Alpha Table, a Store Table, and a UPC Table.

89. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 88, wherein said Final Base Lambda Table, Final Adjustment Alpha Table, Store Table, and UPC Table are used to calculate a probability distribution ~~for an~~ over inter-arrival ~~interval between sales of~~ times for said at least one item, and wherein said inter-arrival ~~interval~~ time is stated

either in units of quantity or sales in monetary units.

90. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 83, wherein ~~the velocity of said at least one item comprises two random variables,~~ an inter-arrival time and a quantity of an item ~~, which~~ are linked together as a renewal-reward process, in which the quantity of ~~an~~ the item is a separate random log-normal variable with a mean beta and a beta variance, and wherein said inter-arrival time comprises a modified Poisson distribution.

91. (currently amended) An item ~~velocity~~ monitoring system, comprising: (a) a plurality of sensing circuits that detect at least one item as it is moved to predetermined locations within a predetermined environment; (b) a computer monitoring system, comprising: (i) a memory circuit for storage of data, said memory circuit containing a quantity of random access memory (RAM) and a bulk memory storage device; (ii) a communications port that is ~~effectively~~ connected to at least one of said sensing circuits and to said memory circuit; and (iii) a processing circuit that is configured to control the flow of data between said memory circuit and said communications port; and is further configured to automatically train said computer monitoring system using either historical data or data gathered in substantially real time, thereby learning ~~item velocities~~ inter-arrival times for a plurality of items.

92. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 91, wherein said ~~item velocities~~ inter-arrival times vary as a function of: total predetermined environment ~~velocity~~ traffic, item category traffic, time of day, day of week, season, holidays, and market conditions of said predetermined environment.

93. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 91, wherein said predetermined environment comprises one of: a retail store, a chain of retails stores, a warehouse, a chain of warehouses, a distribution point, or a chain of distribution points.

94. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 91, wherein said processing circuit is further configured to automatically re-train said computer monitoring system on a periodic basis using substantially real time data throughout a periodic interval.

95. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 91, wherein said training of the computer monitoring system occurs in a plurality of iterative passes to create: a Final Base Lambda Table, a Final Adjustment Alpha Table, a Store Table, and a UPC Table.

96. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 95, wherein said iterative passes comprise: (i) computing Initial Base Lambdas using total store sales and total category sales; (ii) computing Intermediate Base Lambdas using item transaction data and said item's inter-arrival time using said Initial Base Lambdas; (iii) computing Initial Adjustment Alphas using an adjusted item inter-arrival time and a plurality of current effects; (iv) computing Final Base Lambdas using said Initial Adjustment Alphas and using said item transaction data and said item's inter-arrival time; and (v) computing Final Adjustment Alphas using said Final Base Lambdas and a plurality of current effects, and computing a Beta Table.

97. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 96, wherein said Final Base Lambda Table, Final Adjustment Alpha Table, Store Table, and UPC Table are used to calculate a probability distribution ~~for an~~ over inter-arrival ~~interval between sales of~~ times for said at least one item, and wherein said inter-arrival ~~interval~~ time is stated either in units of: quantity or sales in monetary units.

98. (previously presented) The method as recited in claim 1, wherein said predetermined environment comprises a retail store.

99. (previously presented) The method as recited in claim 1, wherein said predetermined environment comprises a warehouse.

100. (previously presented) The method as recited in claim 1, wherein said predetermined environment comprises a manufacture's distribution center.

101. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 12, wherein said computer monitoring system determines a probability ~~pattern~~ distribution of ~~a~~ ~~velocity~~ inter-arrival times of said at least one item during a Learning Mode of operation of said computer monitoring system.

102. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 12, wherein said memory circuit creates or modifies an entry in a database that is stored in said memory circuit such that said entry can later be accessed in substantially real time after said processing circuit compares ~~an observed velocity~~ said waiting time to said probability ~~pattern~~ distribution.

103. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 12, wherein said identification characteristic information comprises: an SKU identifier of said at least one item, or a bar code from a label affixed to said at least one item.

104. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 12, wherein said processing circuit compares ~~an observed velocity~~ said waiting time to said probability ~~pattern~~ distribution substantially in real time with respect to when said processing circuit receives identification characteristic information pertaining to said at least one item as it passes one of said plurality of sensing circuits, during a Detection Mode of operation of said computer monitoring system.

105. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 12,

wherein said processing circuit receives identification characteristic information pertaining to said at least one item as it passes one of said plurality of sensing circuits occurs when said at least one item is being sold at a point-of-sale register within said predetermined environment, during a Detection Mode of operation of said computer monitoring system.

106. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 12, said processing circuit generates ~~a velocity~~ an inter-arrival time event announcement when said ~~observed velocity~~ waiting time is ~~occurring too slowly~~ anomalous is indicative of one of the following conditions: (i) said at least one item is substantially hidden while residing in its correct location on a display shelf; (ii) said at least one item is completely out-of-stock on said display shelf; (iii) said at least one item has been placed at an incorrect location within said predetermined environment, or (iv) access to said at least one item has been substantially prevented by an obstruction.

107. (cancelled)

108. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 12, wherein said processing circuit is further configured to: determine whether or not said ~~observed velocity~~ waiting time is anomalous by comparing ~~the observed velocity~~ said waiting time of said at least one item to [a] said probability ~~velocity model pattern~~ distribution for said at least one item, while taking into consideration at least one of the following factors: varying price conditions, time of day, day of week, week of year, holidays, promotion activities, or competitive activities.

109. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 12, wherein said processing circuit is further configured to: determine whether or not said ~~observed velocity~~ waiting time is anomalous by comparing ~~the observed velocity~~ said waiting time of said

at least one item to [a] said probability ~~velocity model pattern~~ distribution for said at least one item, while taking into consideration a usage history of items being disbursed and received.

110. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 12, wherein said Detection Mode of operation and said Learning Mode of operation occur simultaneously to refine said probability ~~velocity model pattern~~ distribution for said at least one item, and further to detect a new item event and to begin creating a probability ~~velocity model pattern~~ distribution for any such new item.

111. (currently amended) The method as recited in claim 25, wherein when said inter-arrival ~~interval~~ time is stated in units of quantity, said quantity is stated in terms of either the number of unique items sold or the total number of items sold.

112. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 89, wherein when said inter-arrival ~~interval~~ time is stated in units of quantity, said quantity is stated in terms of either the number of unique items sold or the total number of items sold.

113. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 97, wherein when said inter-arrival ~~interval~~ time is stated in units of quantity, said quantity is stated in terms of either the number of unique items sold or the total number of items sold.

114. (currently amended) The method as recited in claim 1, wherein said probability ~~pattern~~ distribution is determined by training said computer monitoring system by use of one of: (i) historical transaction data, or (ii) transaction data that is gathered in substantially real time.

115. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 12, wherein said probability ~~pattern~~ distribution is determined by training said computer monitoring system by use of one of: (i) historical transaction data, or (ii) transaction data that is gathered in substantially real time.

116. (currently amended) The item ~~velocity~~ monitoring system as recited in claim 12, said processing circuit also being configured to: (iv) update said probability ~~pattern of a velocity of~~ distribution over inter-arrival times for said at least one item after it passes one of said plurality of sensing circuits, and (v) store said updated probability ~~pattern~~ distribution in said memory circuit, wherein said updating said probability ~~pattern of a velocity of~~ distribution over inter-arrival times for said at least one item occurs during a Learning Mode of operation of said computer monitoring system.

117. (new) The method as recited in claim 1, wherein information upon which said probability distribution is retrieved is further based on interval information, wherein said interval information is comprised of information about one or more conditions occurring during said waiting time.

118. (new) The method as recited in claim 1, wherein said information about one or more conditions occurring during said waiting time is comprised of information about varying price conditions, time of day, day of week, week of year, holidays, promotion activities, or competitive activities.

119. (new) The method as recited in claim 12, further comprising updating said probability distribution over inter-arrival times for said at least one item after it passes one of said plurality of sensing circuits, and storing said updated probability distribution in said memory circuit, wherein the step of updating said probability distribution over inter-arrival times for said at least one item occurs during a Learning Mode of operation of said computer monitoring system.

120. (new) The system as recited in claim 12, wherein information upon which said probability distribution is retrieved is further based on interval information, wherein said interval

information is comprised of information about one or more conditions occurring during said waiting time.

121. (new) The system as recited in claim 12, wherein said information about one or more conditions occurring during said waiting time is comprised of information about varying price conditions, time of day, day of week, week of year, holidays, promotion activities, or competitive activities.

122. (new) The method as recited in claim 17, wherein information upon which said probability distribution is retrieved is further based on interval information, wherein said interval information is comprised of information about one or more conditions occurring during said waiting time.

123. (new) The method as recited in claim 17, wherein said information about one or more conditions occurring during said waiting time is comprised of information about varying price conditions, time of day, day of week, week of year, holidays, promotion activities, or competitive activities.

124. (new) A method of using a computer processor to monitor items being received and disbursed within a predetermined environment, said method comprising:

(a) providing a computer monitoring system having a memory circuit for storage of data, a communications port, and a processing circuit;

(b) providing a plurality of sensing circuits that detect at least one item as it is moved to predetermined locations within said predetermined environment;

(c) receiving, by way of said communications port, identification characteristic information pertaining to said at least one item as it passes one of said plurality of sensing circuits;

(d) receiving, by way of said communications port, a first arrival time, wherein said first arrival time is a first time when said at least one item was detected by the one of said plurality of sensing circuits;

(e) receiving, by way of said communications port, a second arrival time, wherein said second arrival time is a next time said at least one item is again detected by one of said plurality of sensing circuits, and wherein said second arrival time is later than said first arrival time;

(f) determining, by way of said processing circuit, an observed inter-arrival time for said at least one item, wherein said observed inter-arrival time is an amount of time between said first arrival time and said second arrival time;

(g) retrieving, from said memory circuit, a probability distribution over inter-arrival times for said at least one item, wherein an inter-arrival time is an amount of time between an arrival of said at least one item and a next arrival of said at least one item, and wherein said probability distribution is retrieved, by way of said processing circuit, based on said identification characteristic information;

(h) determining, by way of said processing circuit, based on said retrieved probability distribution, that said observed inter-arrival time is anomalous if a cumulative probability of all inter-arrival times that are less than said observed inter-arrival time is less than a predetermined threshold; and

(i) generating, by way of said processing circuit, an inter-arrival time event announcement for said at least one item whenever said observed inter-arrival time is anomalous.

125. (new) The method as recited in claim 124, further comprising:

(j) repeating steps (d) – (g) for one to six, additional, consecutive arrivals of said at least one item;

and wherein the step of determining, by way of said processing circuit, based on said retrieved probability distribution, that said observed inter-arrival time is anomalous is based on said one to six, additional, consecutive arrivals of said at least one item.

126. (new) The method as recited in claim 124, further comprising:

(j) repeating steps (d) – (g) for three, additional, consecutive arrivals of said at least one item;

and wherein the step of determining, by way of said processing circuit, based on said retrieved probability distribution, that said observed inter-arrival time is anomalous is based on said three, additional, consecutive arrivals of said at least one item.

127. (new) An item ~~velocity~~ monitoring system, comprising:

(a) a plurality of sensing circuits that detect at least one item as it is moved to predetermined locations within a predetermined environment;

(b) a computer monitoring system, comprising:

(i) a memory circuit for storage of data, said memory circuit containing a quantity of random access memory (RAM) and a bulk memory storage device;

(ii) a communications port that is connected to at least one of said sensing circuits and to said memory circuit; and

(iii) a processing circuit that is configured to control the flow of data between said memory circuit and said communications port;

(c) said processing circuit also being configured to:

(i) receive, by way of said communications port, identification characteristic information pertaining to said at least one item as it passes one of said plurality of sensing circuits;

(ii) receive, by way of said communications port, a first arrival time, wherein said first arrival time is a first time when said at least one item was detected by the one of said plurality of sensing circuits;

(iii) receive, by way of said communications port, a second arrival time, wherein said second arrival time is a next time said at least one item is again detected by one of said plurality of sensing circuits, and wherein said second arrival time is later than said first arrival time;

(iv) determine, by way of said processing circuit, an observed inter-arrival time for said at least one item, wherein said observed inter-arrival time is an amount of time between said first arrival time and said second arrival time;

(v) retrieve, from said memory circuit, a probability distribution over inter-arrival times for said at least one item, wherein an inter-arrival time is an amount of time between an arrival of said at least one item and a next arrival of said at least one item, and wherein said probability distribution is retrieved, by way of said processing circuit, based on said identification characteristic information;

(vi) determine, by way of said processing circuit, based on said retrieved probability distribution, that said observed inter-arrival time is anomalous if a cumulative probability of all inter-arrival times that are less than said observed inter-arrival time is less than a predetermined threshold; and

(vii) generate, by way of said processing circuit, an inter-arrival time event announcement for said at least one item whenever said observed inter-arrival time is anomalous.

Remarks/Arguments

Claims 1-40 and 83-116 are pending in the present application as of the mailing of the present Office Action. Claims 8 and 107 have been cancelled; claims 117- 127 are new.

The Office Action has rejected the Claims 1-40 and 83-113[1] under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant has amended Claims 1, 12, 17, 34, 83 and 91, which overcomes the rejection based on 35 U.S.C. 112, second paragraph.

The Office Action has rejected Claims 1-40 and 83-113[2] under 35 U.S.C. 103(a) as being obvious over Teicher et al. in view of Tone et al. Applicant respectfully disagrees.

Teicher et al. discloses a system and method for determining sales promotion prices of products offered for sale based on the *sales volume* of such products. Tone et al. discloses a system and method for predicting *sales volume* for products and, based on such *sales volume* predictions, ordering such products for restocking. With respect to Claims 1, and 12, as amended, the combination of Teicher et al. and Tone et al., even if properly combinable, do not disclose any of the following elements and/or limitations: 1) receiving an arrival time, the arrival time being a time when an item was detected by a sensing circuit; 2) determining a waiting time for the item, the waiting time being the amount of time between the arrival time and a later time, the later time being prior to a next time the item is again detected; (3) retrieving a probability distribution over inter-arrival times for the item, an inter-arrival time being the amount of time between an arrival of the item and a next arrival of the item, the probability distribution being retrieved based on identification characteristic information and the inter-arrival time; (4) determining that the waiting time is anomalous if a cumulative probability of all inter-arrival

[1] No mention of 114-116.
[2] No mention of 114-116.

times that are greater than the waiting time is less than a predetermined threshold, and (5) if so generating an inter-arrival time event announcement that the waiting time is anomalous.

Similarly, with respect to Claims 124 and 127, the combination of Teicher et al. and Tone et al., even if properly combinable, do not disclose any of the following elements and/or limitations: 1) receiving a first arrival time, the first arrival time being a time when an item was detected by a sensing circuit; 2) receiving a second arrival time, the second arrival time being a next time the item is again detected by one of the sensing circuits and is later than the first arrival time; (3) determining an observed inter-arrival time for the item, the observed inter-arrival time being the amount of time between the first arrival time and the second arrival time; (4) retrieving a probability distribution over inter-arrival times for the item, an inter-arrival time being the amount of time between an arrival of the item and a next arrival of the item, the probability distribution being retrieved based on identification characteristic information; (5) determining, by way of said processing circuit, based on said retrieved probability distribution, that said observed inter-arrival time is anomalous if a cumulative probability of all inter-arrival times that are less than said observed inter-arrival time is less than a predetermined threshold; and (6) if so generating an inter-arrival time event announcement that the waiting time is anomalous.

Conclusion

Applicants believe that this case is now in condition for an immediate allowance, and such action is respectfully requested. If any issue remains unresolved, Applicant's counsel would appreciate the opportunity for a telephone interview to expedite allowance.

Respectfully submitted,

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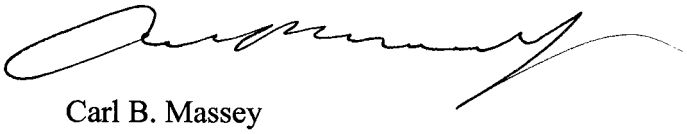

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Date: February 1, 2006
File No.: S48906 1020.1